FIG. 1

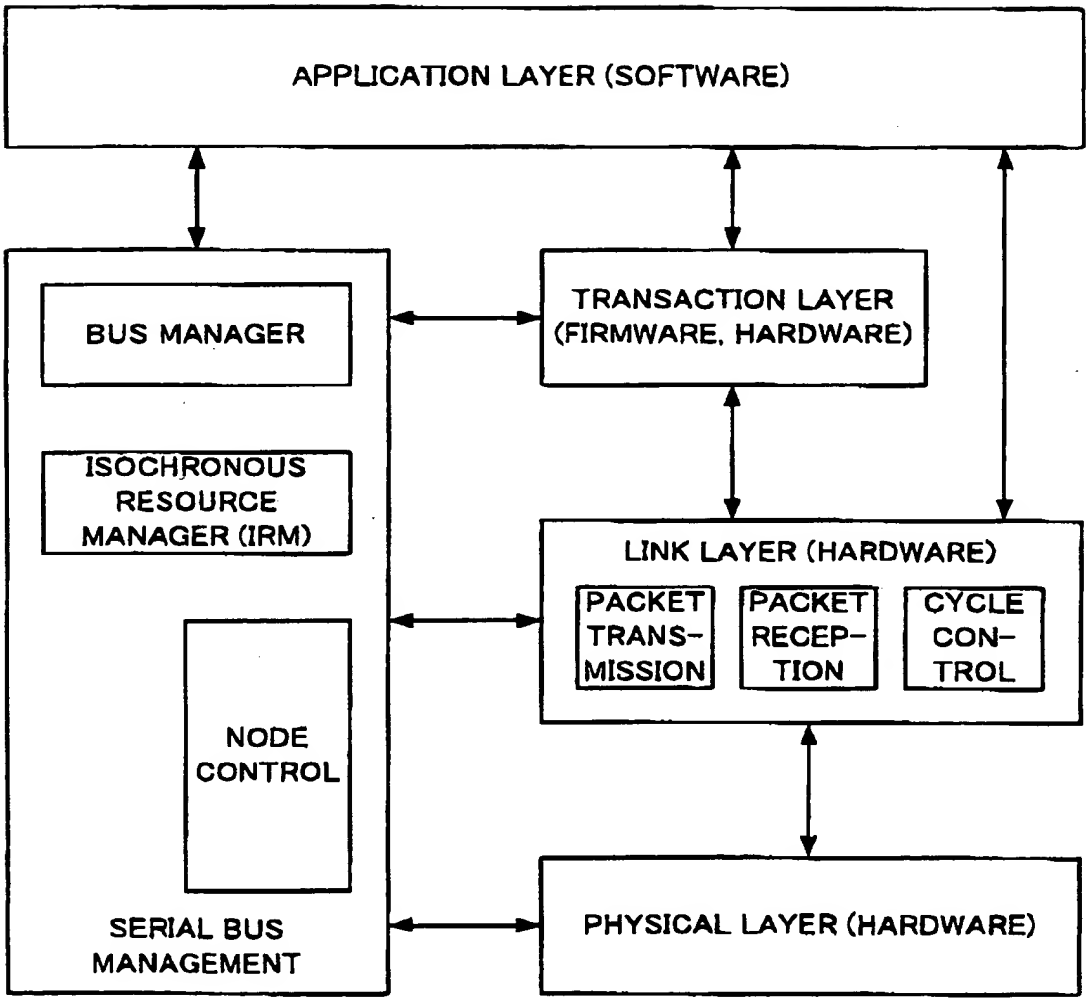
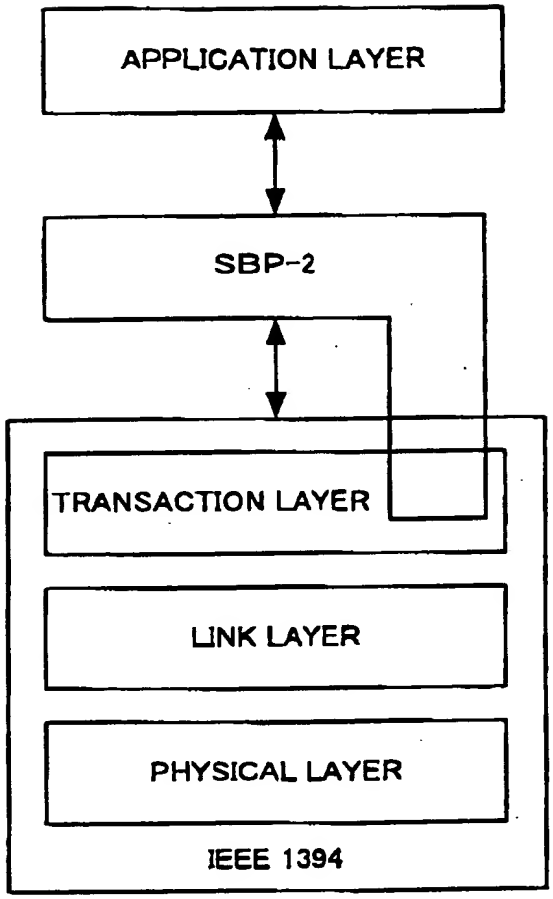

APPLICATION LAYER (SOFTWARE)
BUS MANAGER
ISOCHRONOUS RESOURCE MANAGER (IRM)
NODE CONTROL
SERIAL BUS MANAGEMENT
TRANSACTION LAYER (FIRMWARE, HARDWARE)
LINK LAYER (HARDWARE)
PACKET TRANS-MISSION
PACKET RECEP-TION
CYCLE CON-TROL
PHYSICAL LAYER (HARDWARE)

FIG. 2



0960944-040200

FIG. 3

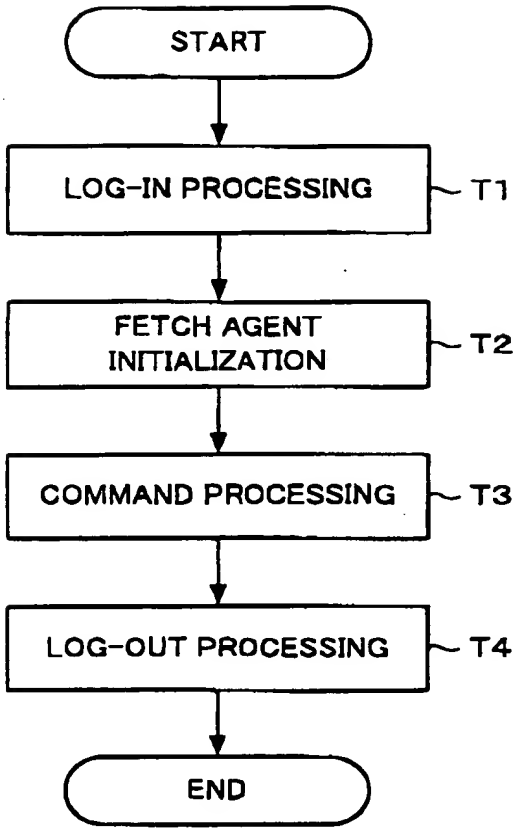

START
LOG-IN PROCESSING
T1
FETCH AGENT INITIALIZATION
T2
COMMAND PROCESSING
T3
LOG-OUT PROCESSING
T4
END

FIG. 4

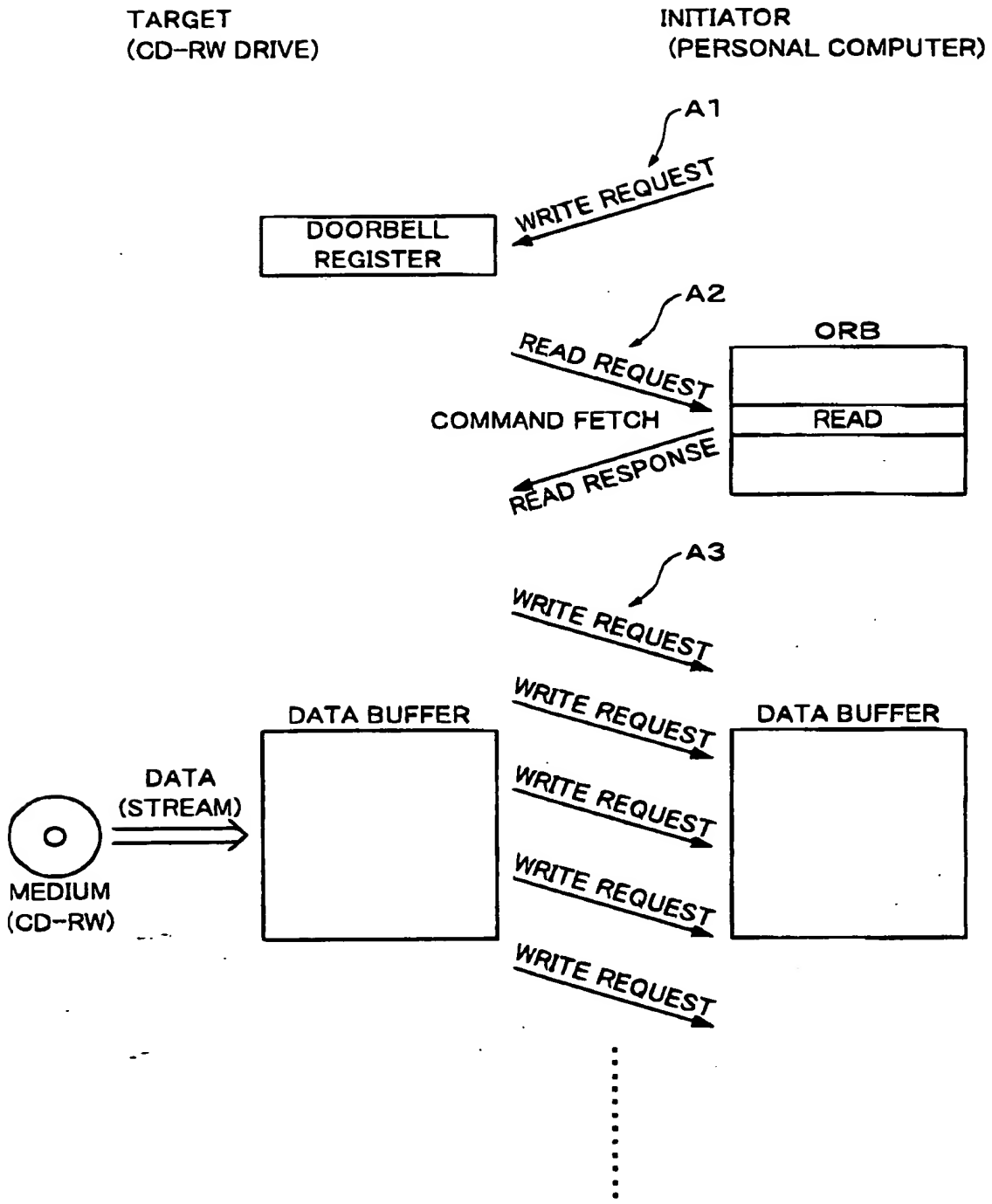

TARGET
(CD-RW DRIVE)
INITIATOR
(PERSONAL COMPUTER)
A1
WRITE REQUEST
DOORBELL
REGISTER
A2
READ REQUEST
ORB
COMMAND FETCH
READ
READ RESPONSE
A3
WRITE REQUEST
WRITE REQUEST
DATA BUFFER
DATA BUFFER
DATA
(STREAM)
WRITE REQUEST
WRITE REQUEST
WRITE REQUEST
MEDIUM
(CD-RW)

FIG. 5

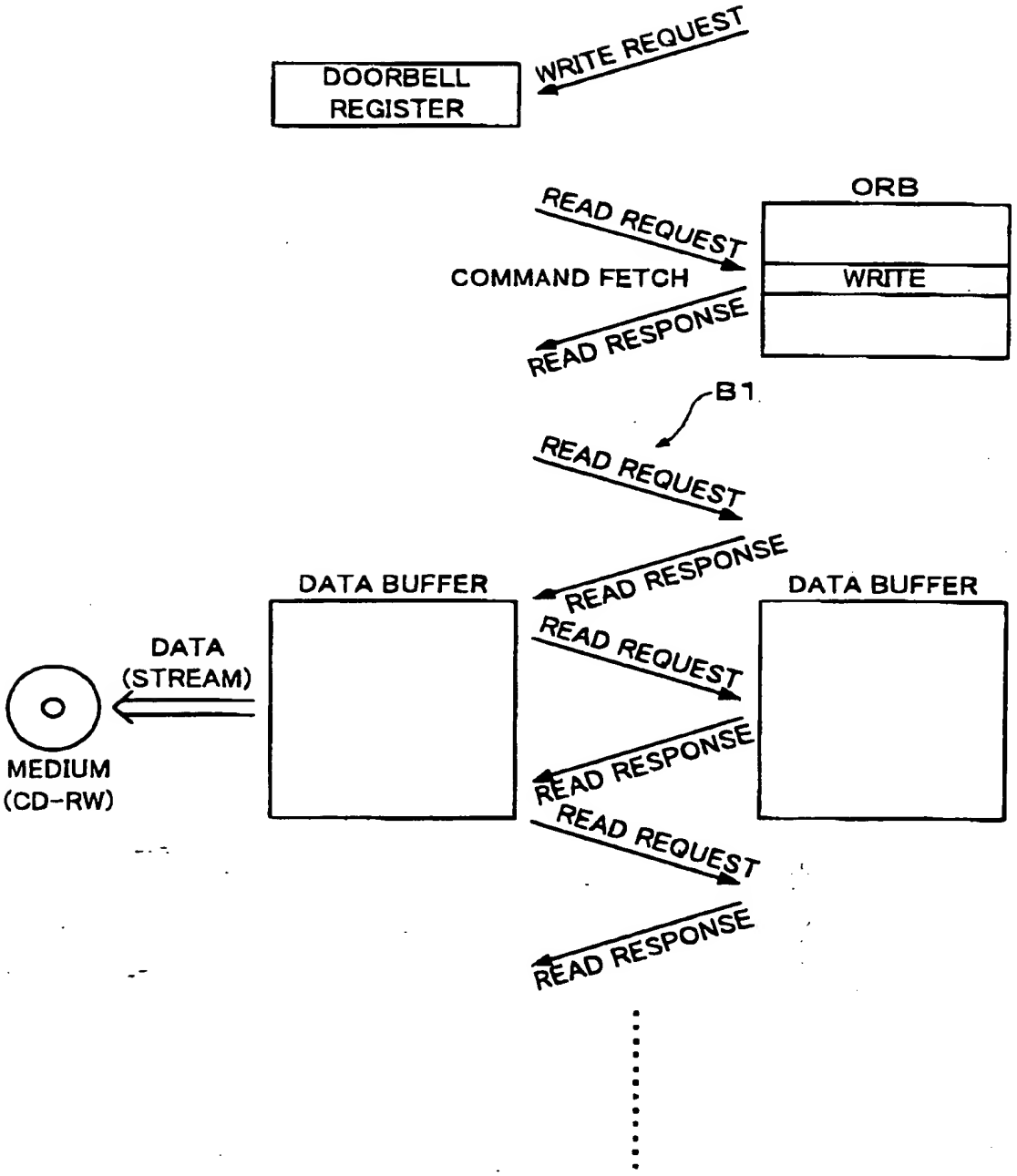

TARGET
(CD-RW DRIVE)
INITIATOR
(PERSONAL COMPUTER)
DOORBELL REGISTER
WRITE REQUEST
ORB
READ REQUEST
COMMAND FETCH
WRITE
READ RESPONSE
B1
READ REQUEST
READ RESPONSE
DATA BUFFER
DATA BUFFER
DATA
(STREAM)
READ REQUEST
MEDIUM
(CD-RW)
READ RESPONSE
READ REQUEST
READ RESPONSE

FIG. 6A

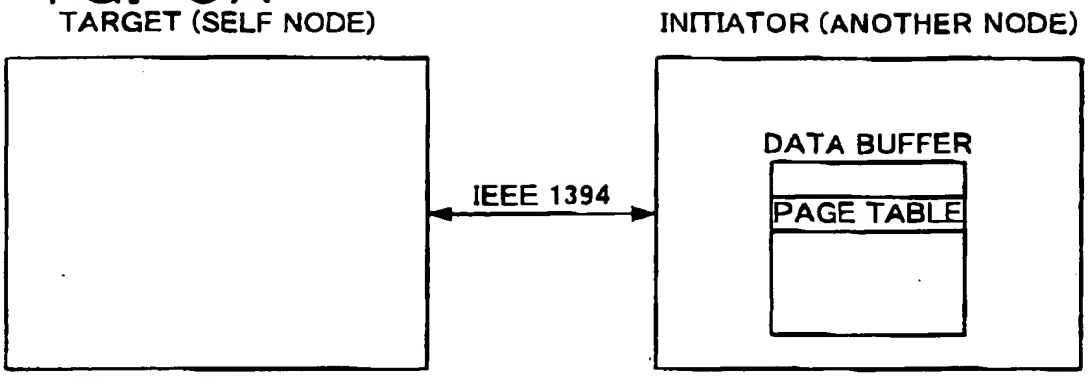


FIG. 6B

WHEN A PAGE TABLE EXISTS

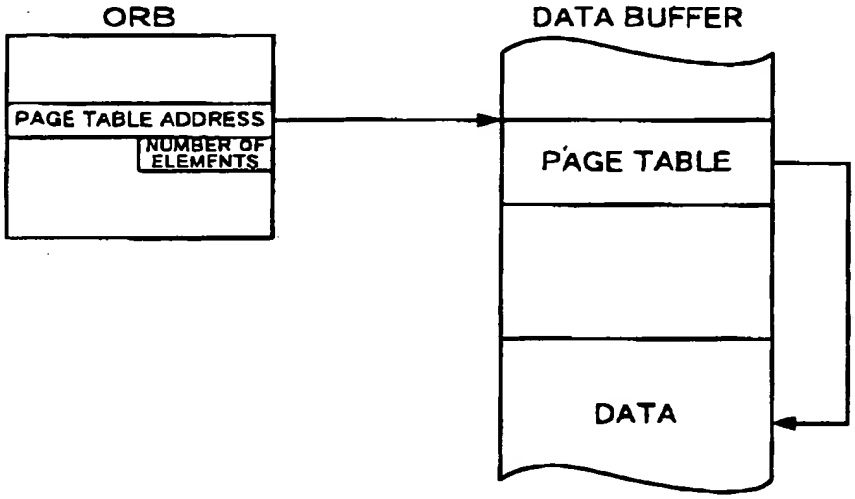
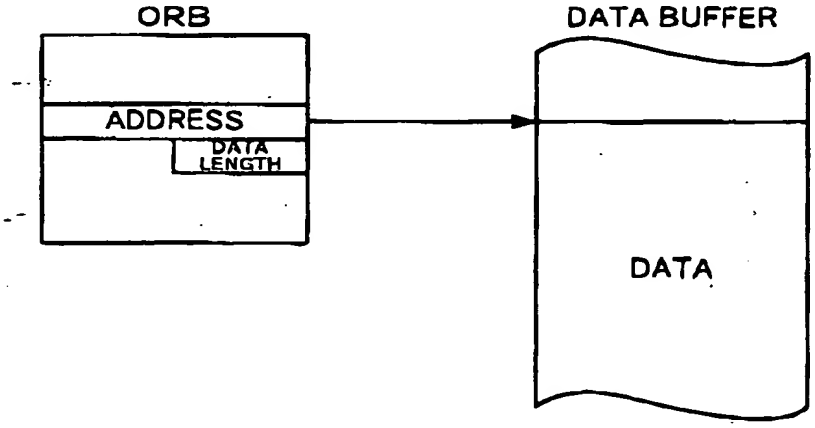


FIG. 6C

WHEN NO PAGE TABLE EXISTS



0505045-1040205

0027207 "45960

FIG. 7

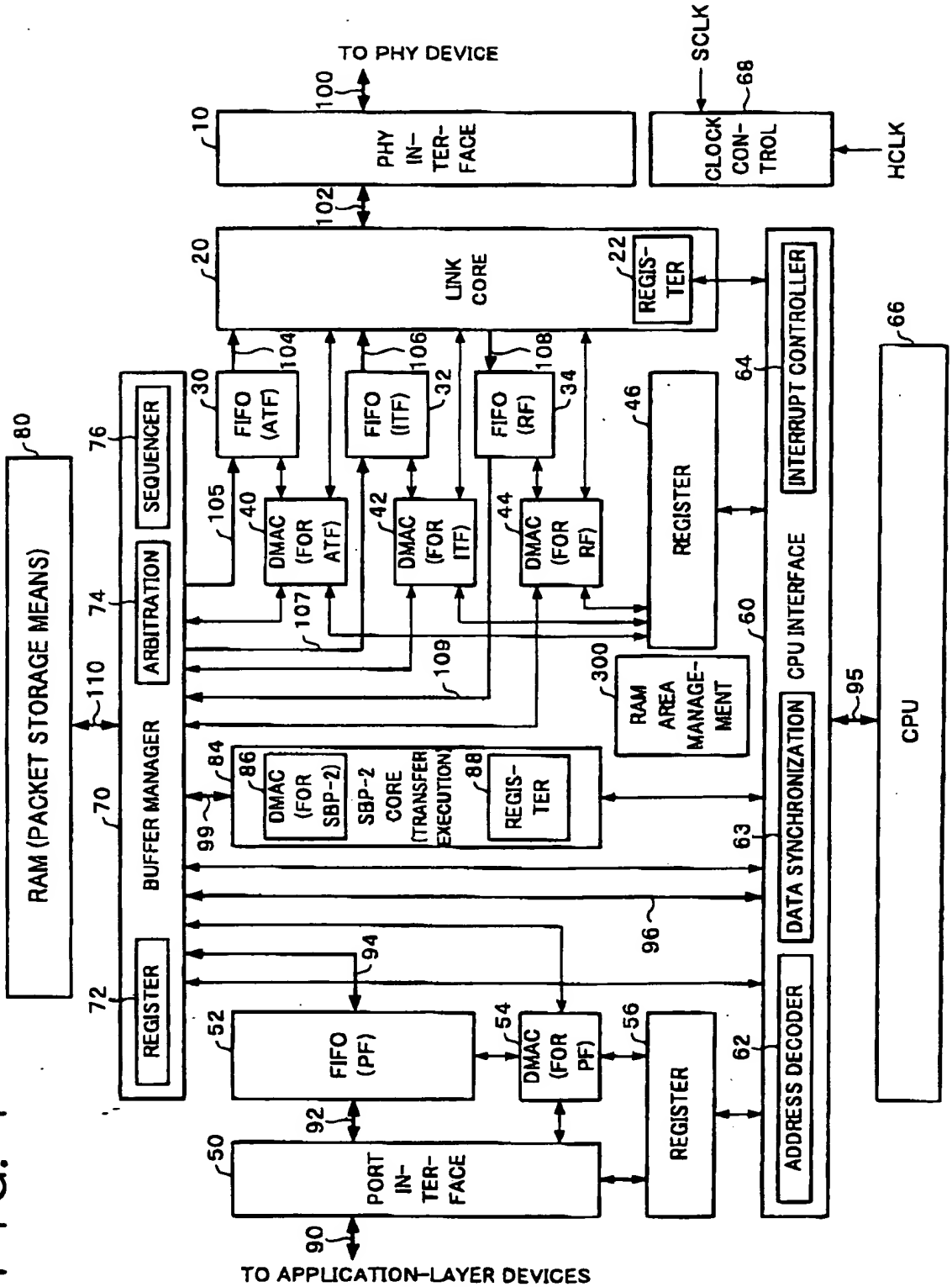
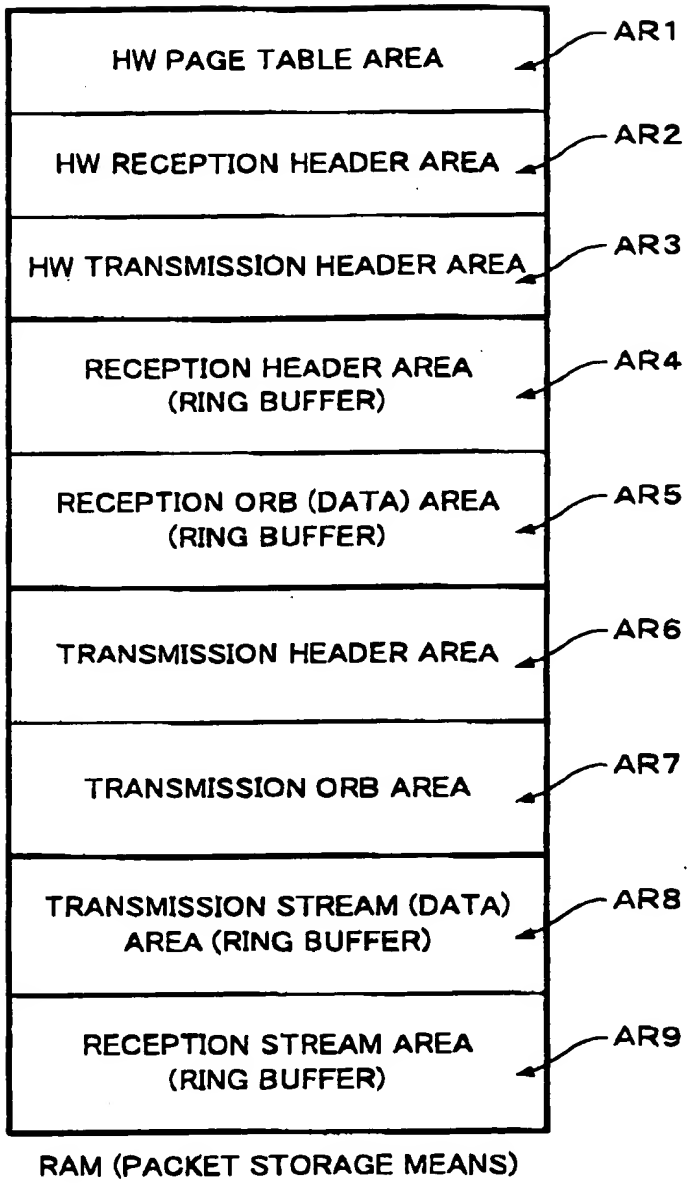


FIG. 8



RAM (PACKET STORAGE MEANS)

0965944-140200

FIG. 9

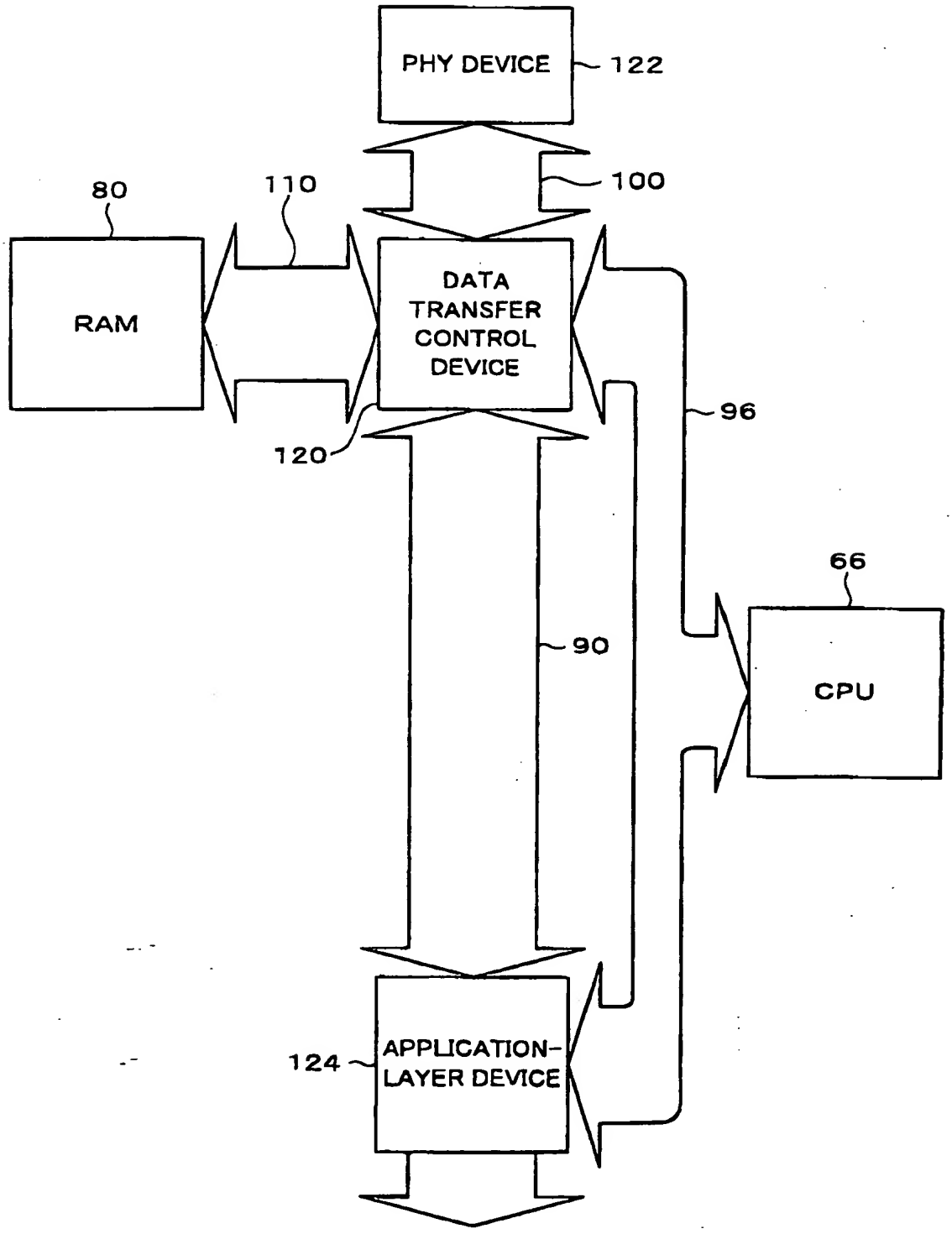

PHY DEVICE
122
100
80
110
RAM
DATA TRANSFER CONTROL DEVICE
96
120
66
90
CPU
124
APPLICATION-LAYER DEVICE

FIG. 10

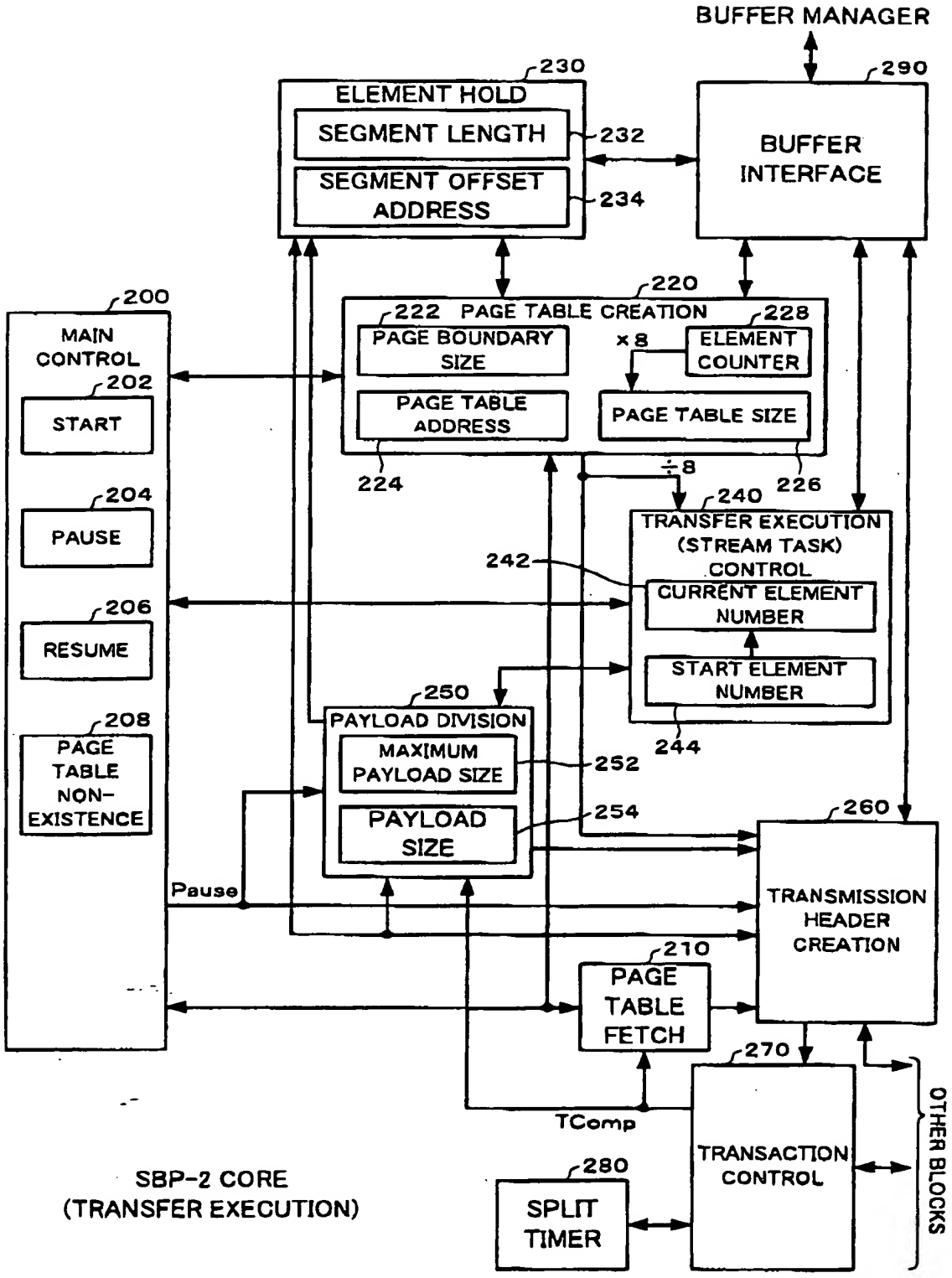

BUFFER MANAGER
290
BUFFER INTERFACE
230
ELEMENT HOLD
SEGMENT LENGTH
232
SEGMENT OFFSET ADDRESS
234
200
MAIN CONTROL
202
START
204
PAUSE
206
RESUME
208
PAGE TABLE NON-EXISTENCE
220
222 PAGE TABLE CREATION
228
PAGE BOUNDARY SIZE
×8
ELEMENT COUNTER
PAGE TABLE ADDRESS
PAGE TABLE SIZE
224
÷8
226
240
TRANSFER EXECUTION (STREAM TASK) CONTROL
242
CURRENT ELEMENT NUMBER
START ELEMENT NUMBER
244
250
PAYLOAD DIVISION
MAXIMUM PAYLOAD SIZE
252
PAYLOAD SIZE
254
260
TRANSMISSION HEADER CREATION
Pause
210
PAGE TABLE FETCH
270
TRANSACTION CONTROL
OTHER BLOCKS
TComp
280
SPLIT TIMER
SBP-2 CORE
(TRANSFER EXECUTION)

FIG. 11

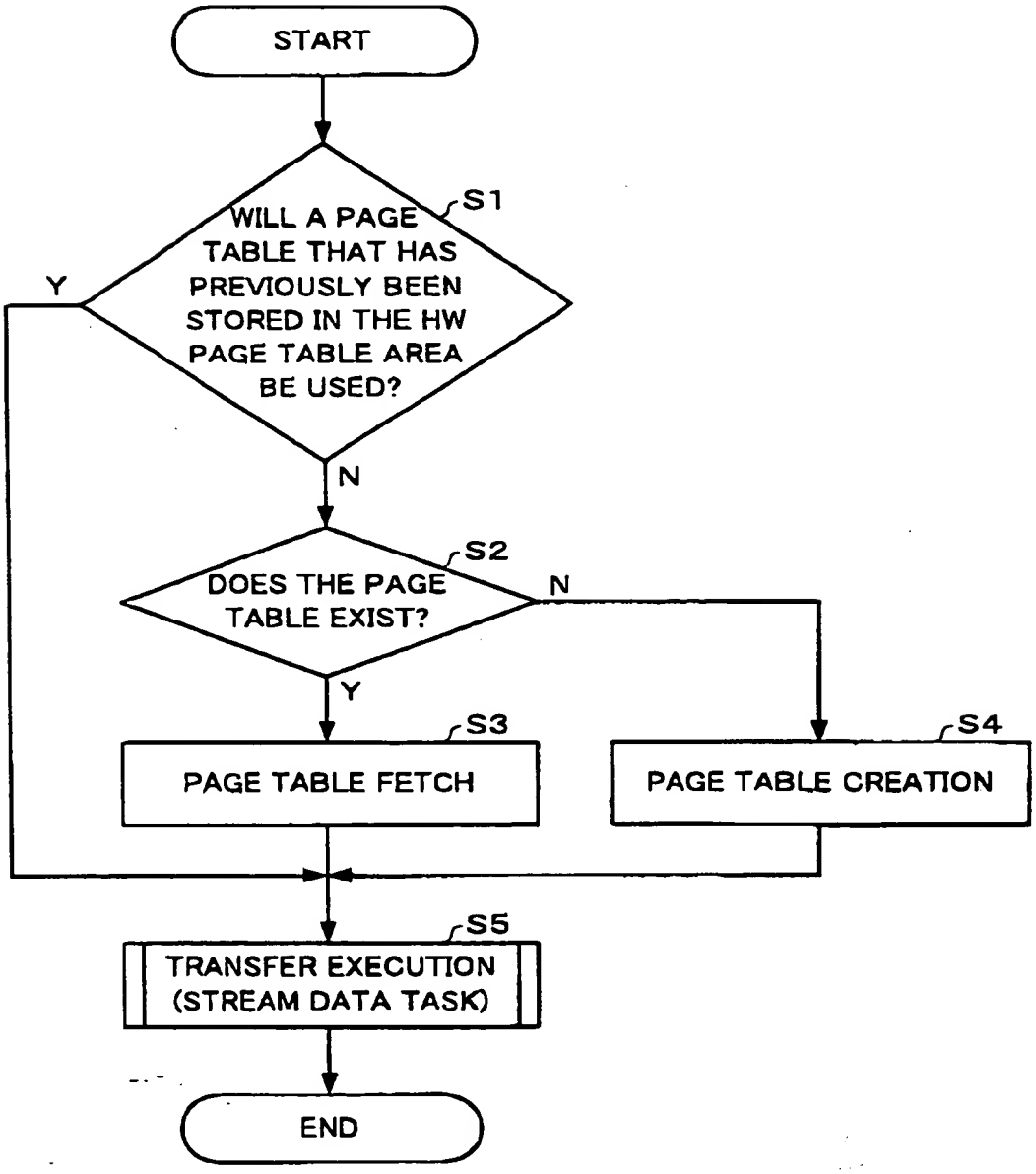
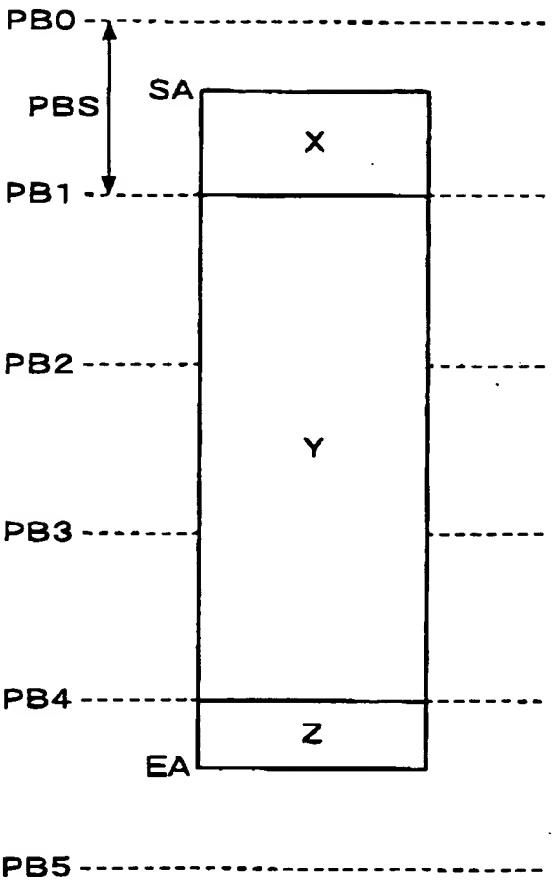

START
S1
WILL A PAGE TABLE THAT HAS PREVIOUSLY BEEN STORED IN THE HW PAGE TABLE AREA BE USED?
Y
N
S2
DOES THE PAGE TABLE EXIST?
N
Y
S3
PAGE TABLE FETCH
S4
PAGE TABLE CREATION
S5
TRANSFER EXECUTION (STREAM DATA TASK)
END

FIG. 12



05605945-040200

FIG. 13

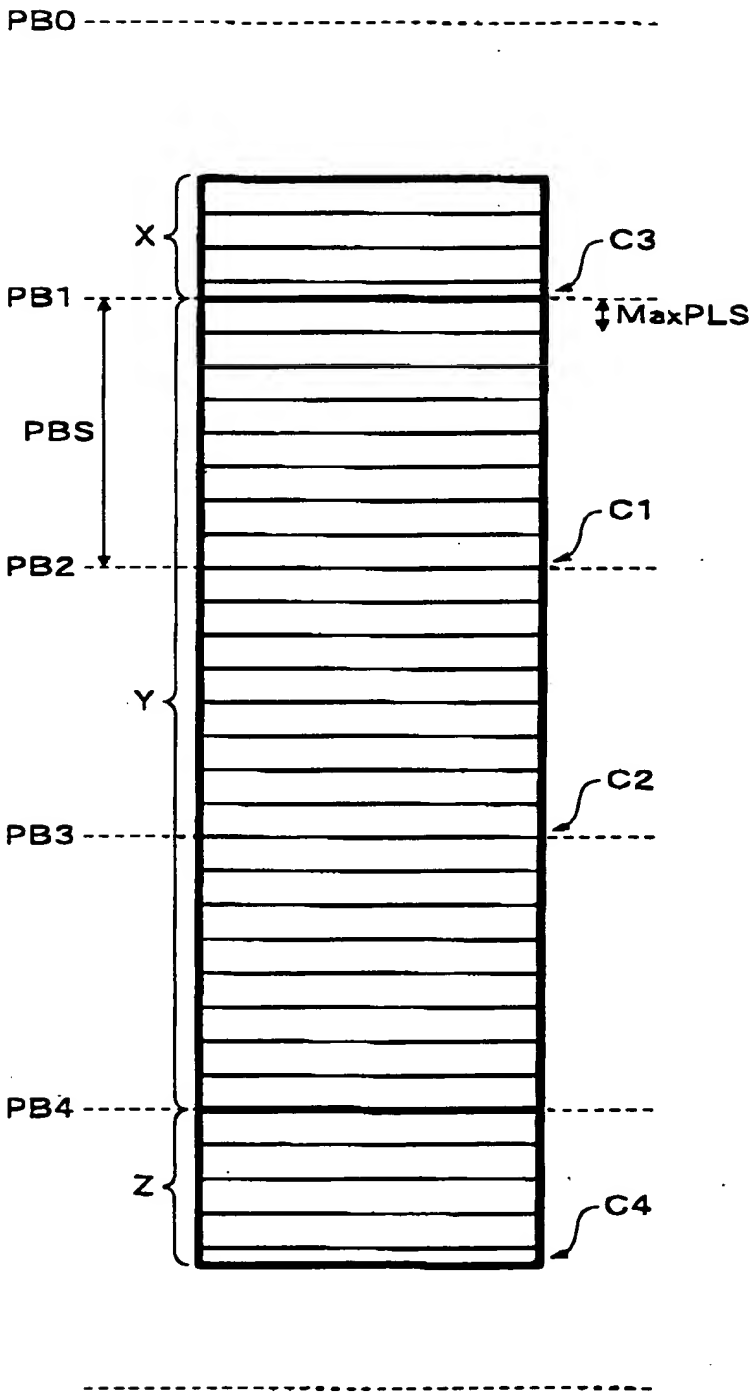


FIG. 14

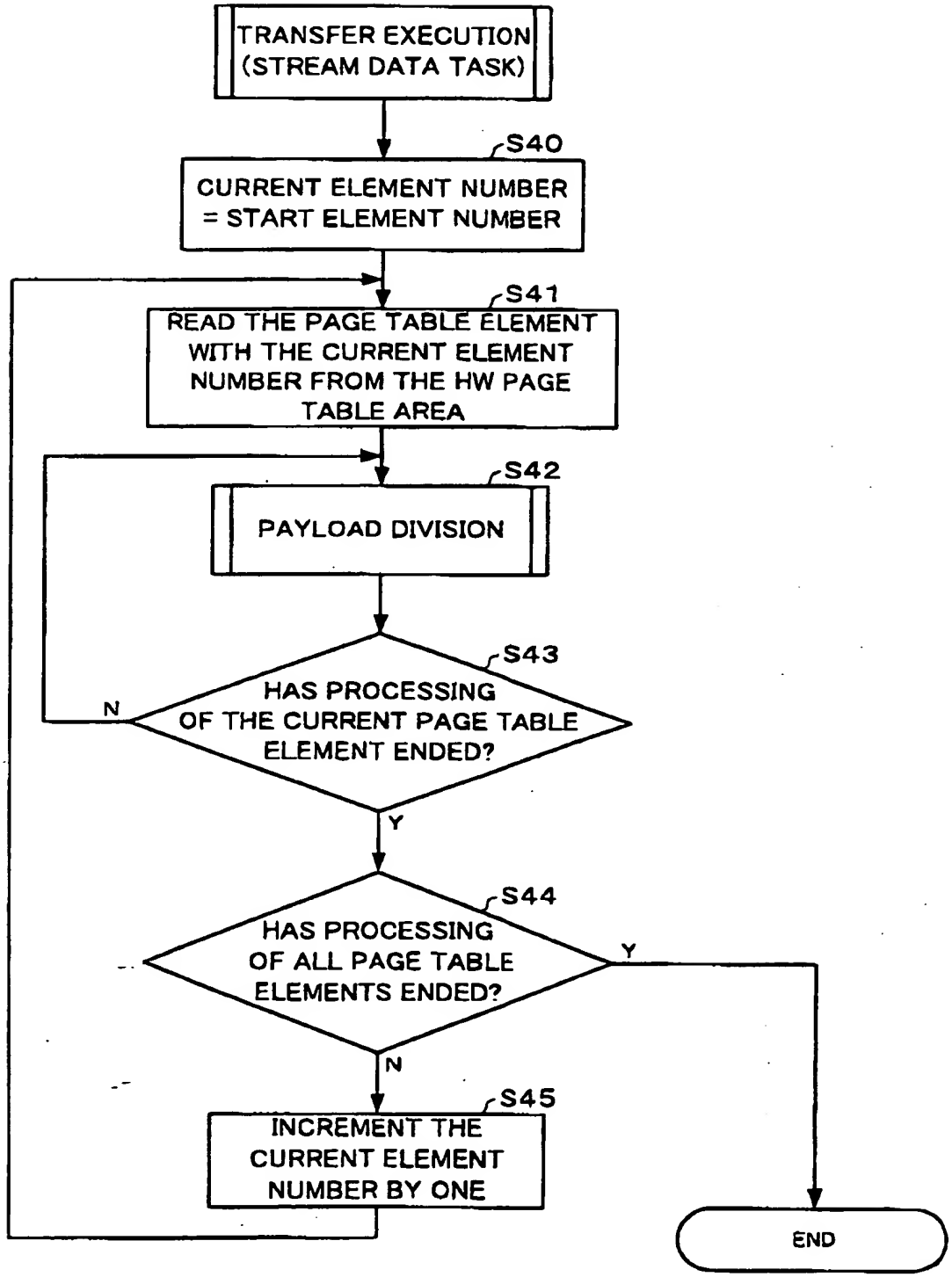

TRANSFER EXECUTION (STREAM DATA TASK)
S40
CURRENT ELEMENT NUMBER = START ELEMENT NUMBER
S41
READ THE PAGE TABLE ELEMENT WITH THE CURRENT ELEMENT NUMBER FROM THE HW PAGE TABLE AREA
S42
PAYLOAD DIVISION
S43
HAS PROCESSING OF THE CURRENT PAGE TABLE ELEMENT ENDED?
N
Y
S44
HAS PROCESSING OF ALL PAGE TABLE ELEMENTS ENDED?
Y
N
S45
INCREMENT THE CURRENT ELEMENT NUMBER BY ONE
END

FIG. 15

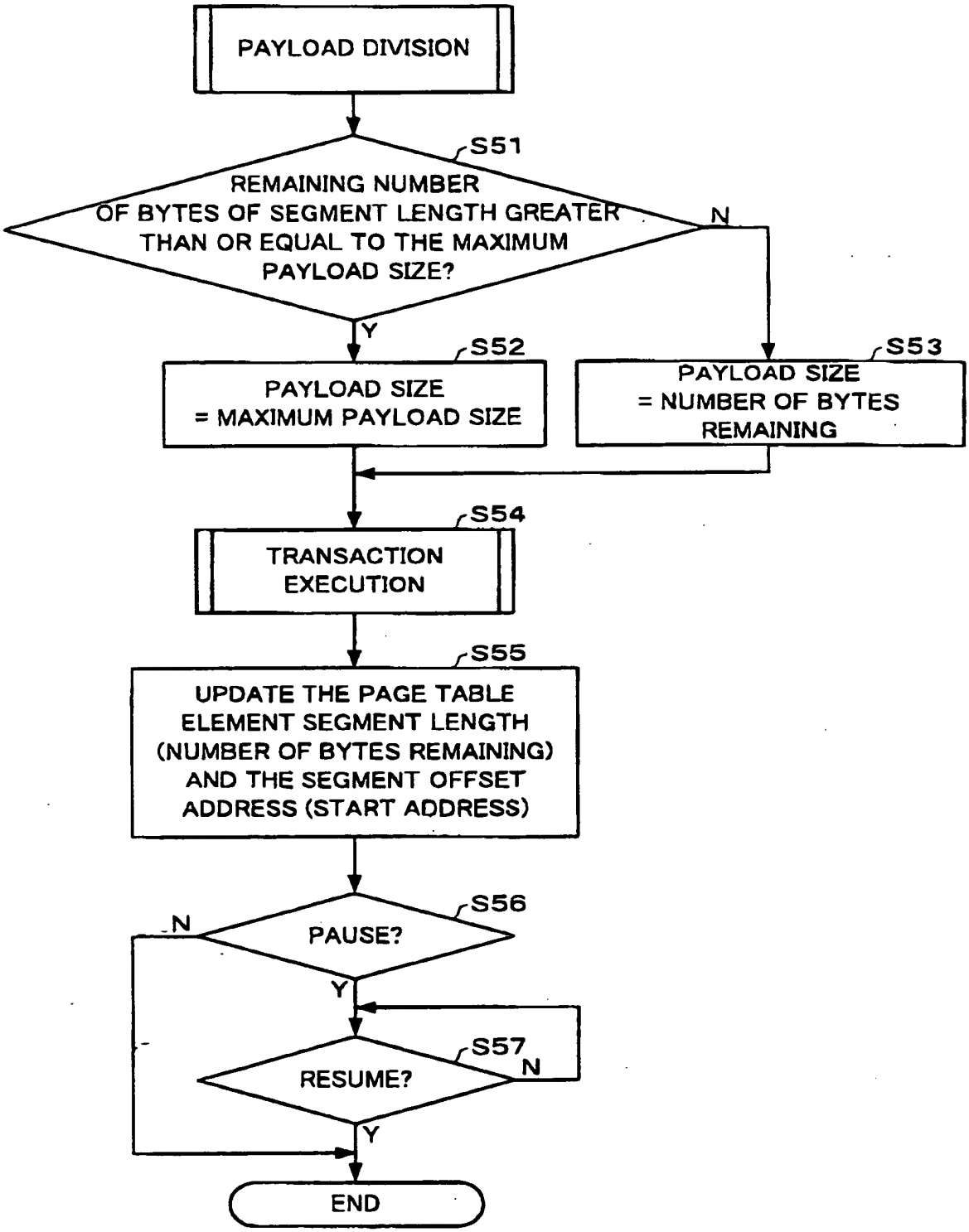
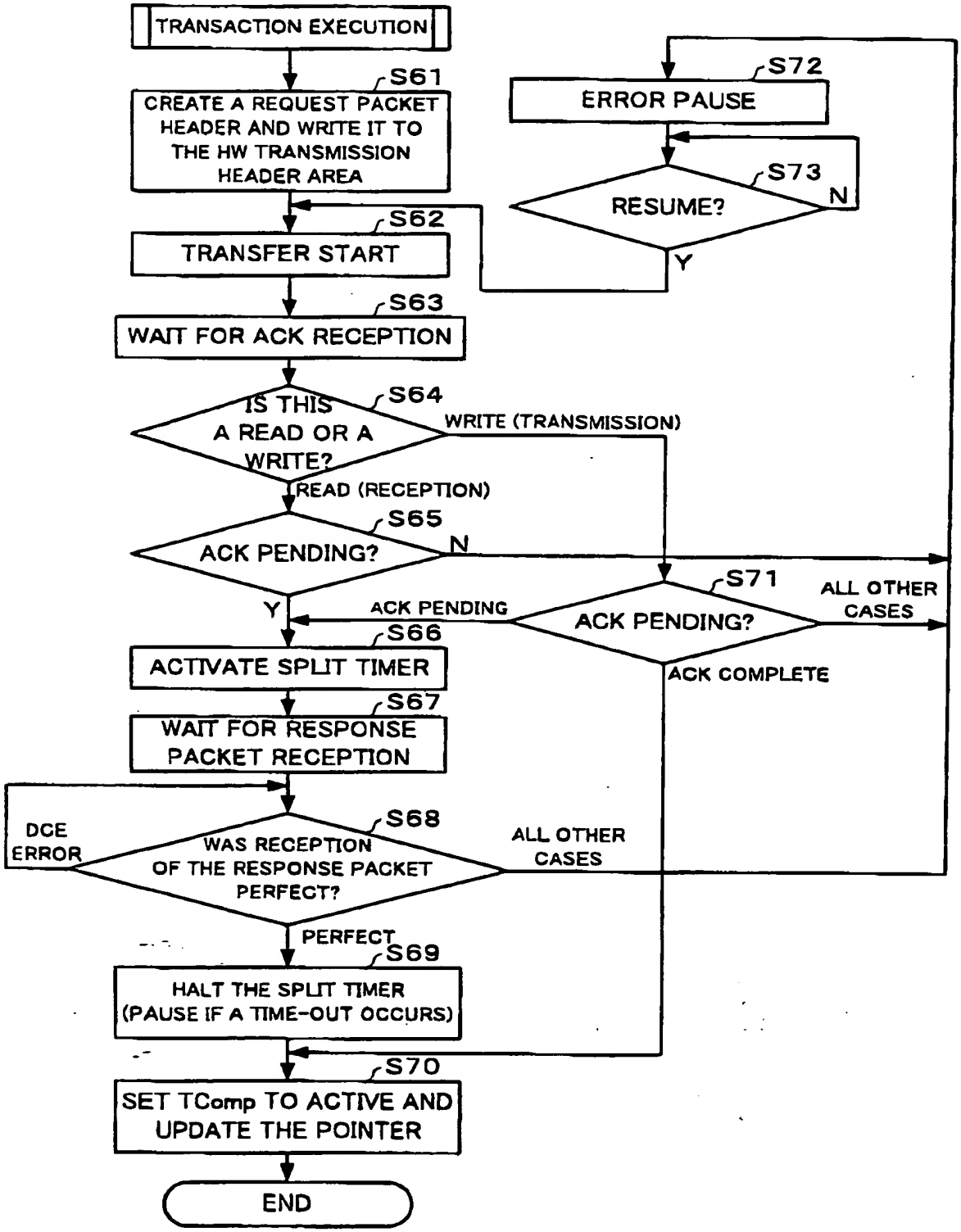

PAYLOAD DIVISION
S51
REMAINING NUMBER OF BYTES OF SEGMENT LENGTH GREATER THAN OR EQUAL TO THE MAXIMUM PAYLOAD SIZE?
N
Y
S52
PAYLOAD SIZE = MAXIMUM PAYLOAD SIZE
S53
PAYLOAD SIZE = NUMBER OF BYTES REMAINING
S54
TRANSACTION EXECUTION
S55
UPDATE THE PAGE TABLE ELEMENT SEGMENT LENGTH (NUMBER OF BYTES REMAINING) AND THE SEGMENT OFFSET ADDRESS (START ADDRESS)
S56
N
PAUSE?
Y
S57
RESUME?
N
Y
END

FIG. 16



US 6,804,744 B2

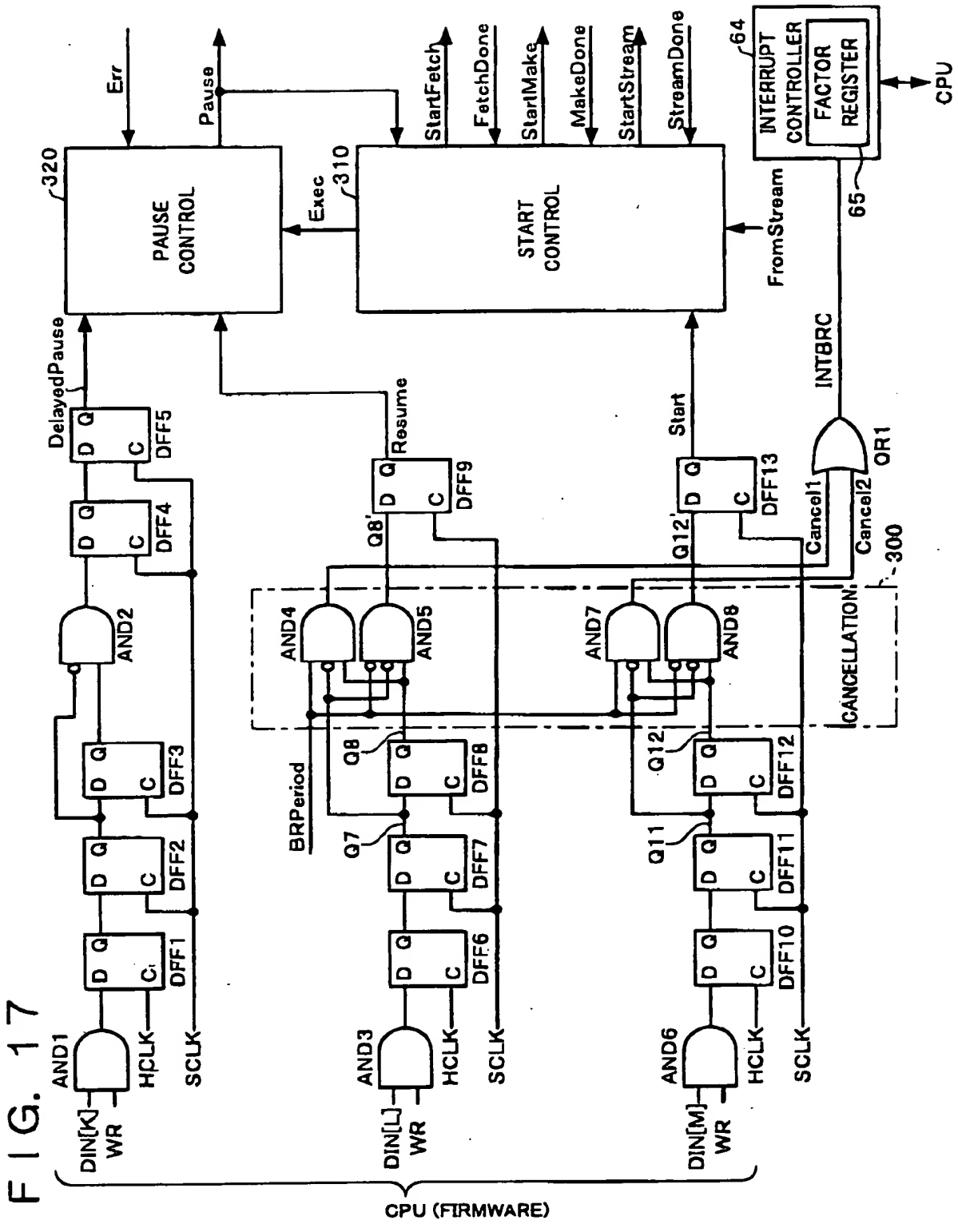
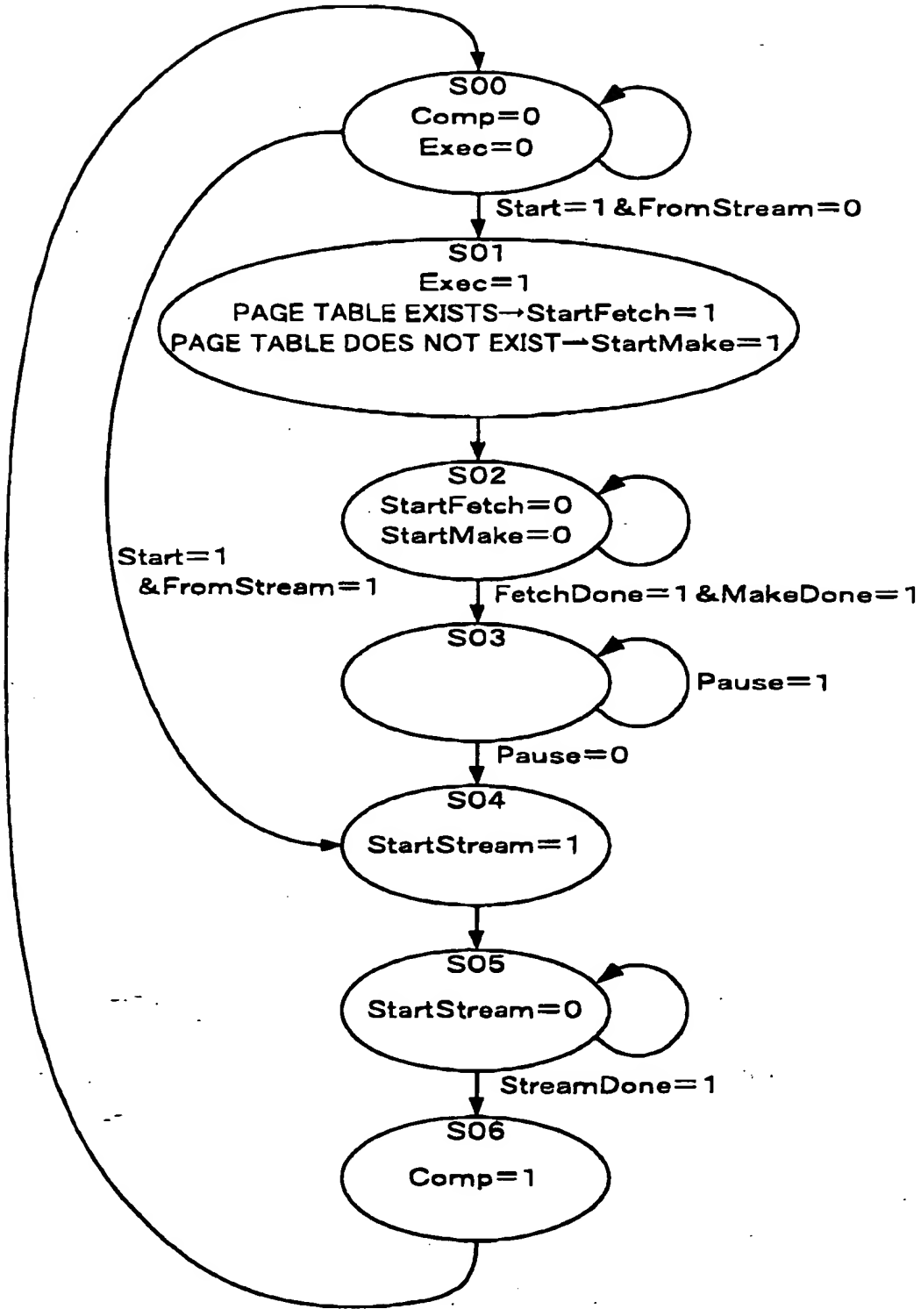

Err
Pause
StartFetch
FetchDone
StartMake
MakeDone
StartStream
StreamDone
64
INTERRUPT CONTROLLER
FACTOR REGISTER
CPU
320
PAUSE CONTROL
Exec
310
START CONTROL
FromStream
65
DelayedPause
Resume
Start
INTBRC
DFF5
DFF4
DFF3
DFF2
DFF1
DFF9
DFF13
DFF8
DFF7
DFF6
DFF12
DFF11
DFF10
OR1
Cancel1
Cancel2
300
CANCELLATION
AND1
AND2
AND3
AND4
AND5
AND6
AND7
AND8
HCLK
SCLK
BRPeriod
Q8'
Q12'
Q8
Q7
Q12
Q11
DIN[K]
WR
DIN[L]
DIN[M]
CPU (FIRMWARE)

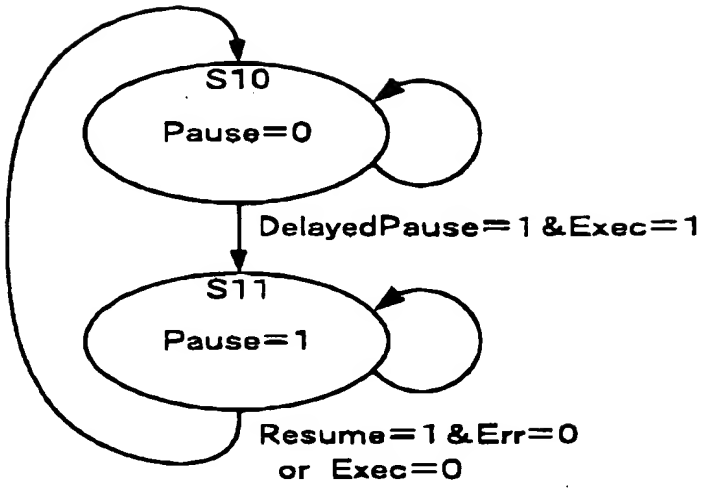
FIG. 17

FIG. 18



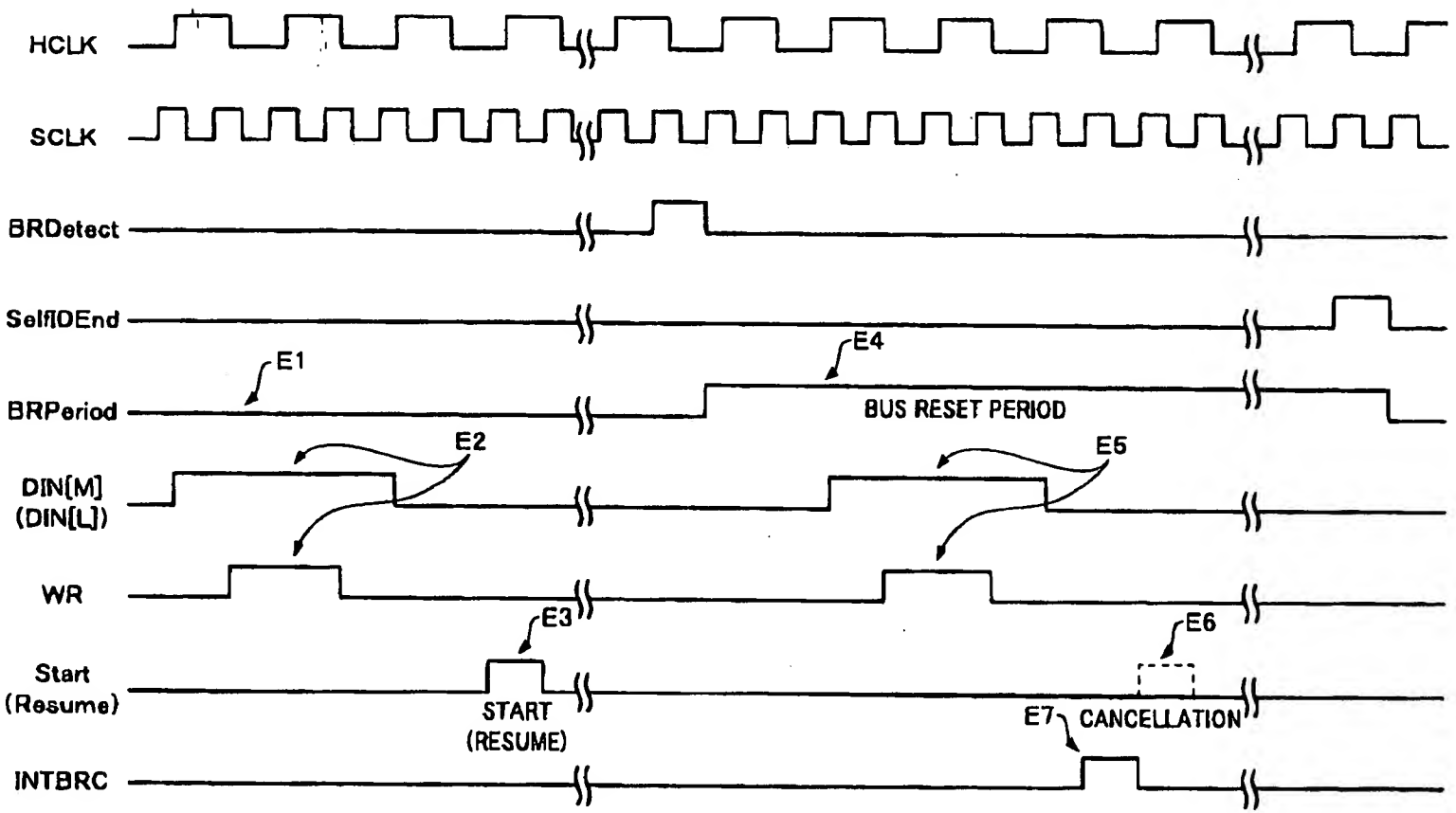
5,966,544 - 10/12/99

FIG. 19



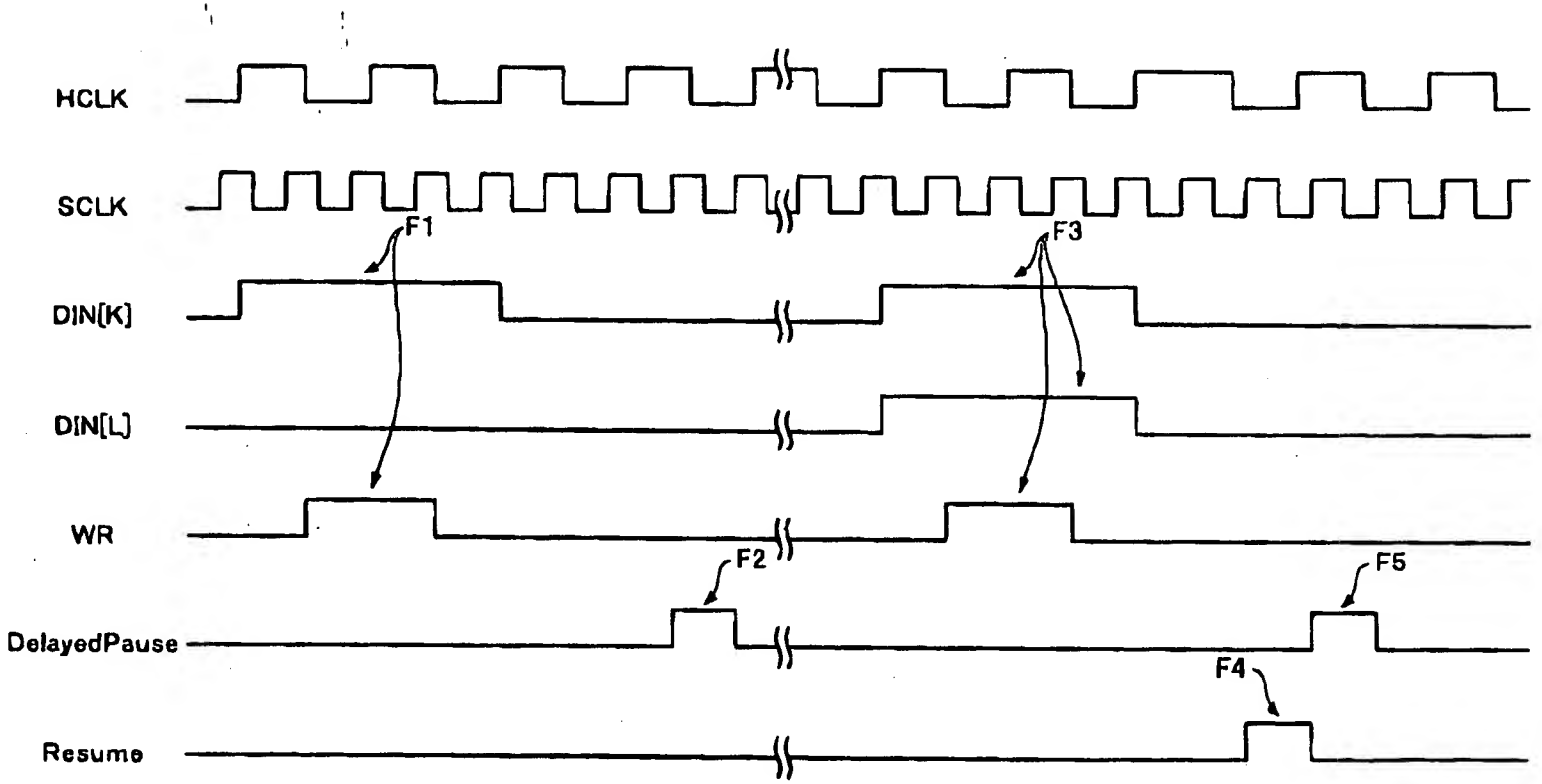
0960944-1042000

FIG. 20


HCLK
SCLK
BRDetect
SelfIOEnd
E1
E4
BRPeriod
BUS RESET PERIOD
E2
E5
DIN[M]
(DIN[L])
WR
E3
E6
Start
(Resume)
START
(RESUME)
E7
CANCELLATION
INTBRC

002701 "4698960

FIG. 21



00270F" 4T698960

FIG. 22

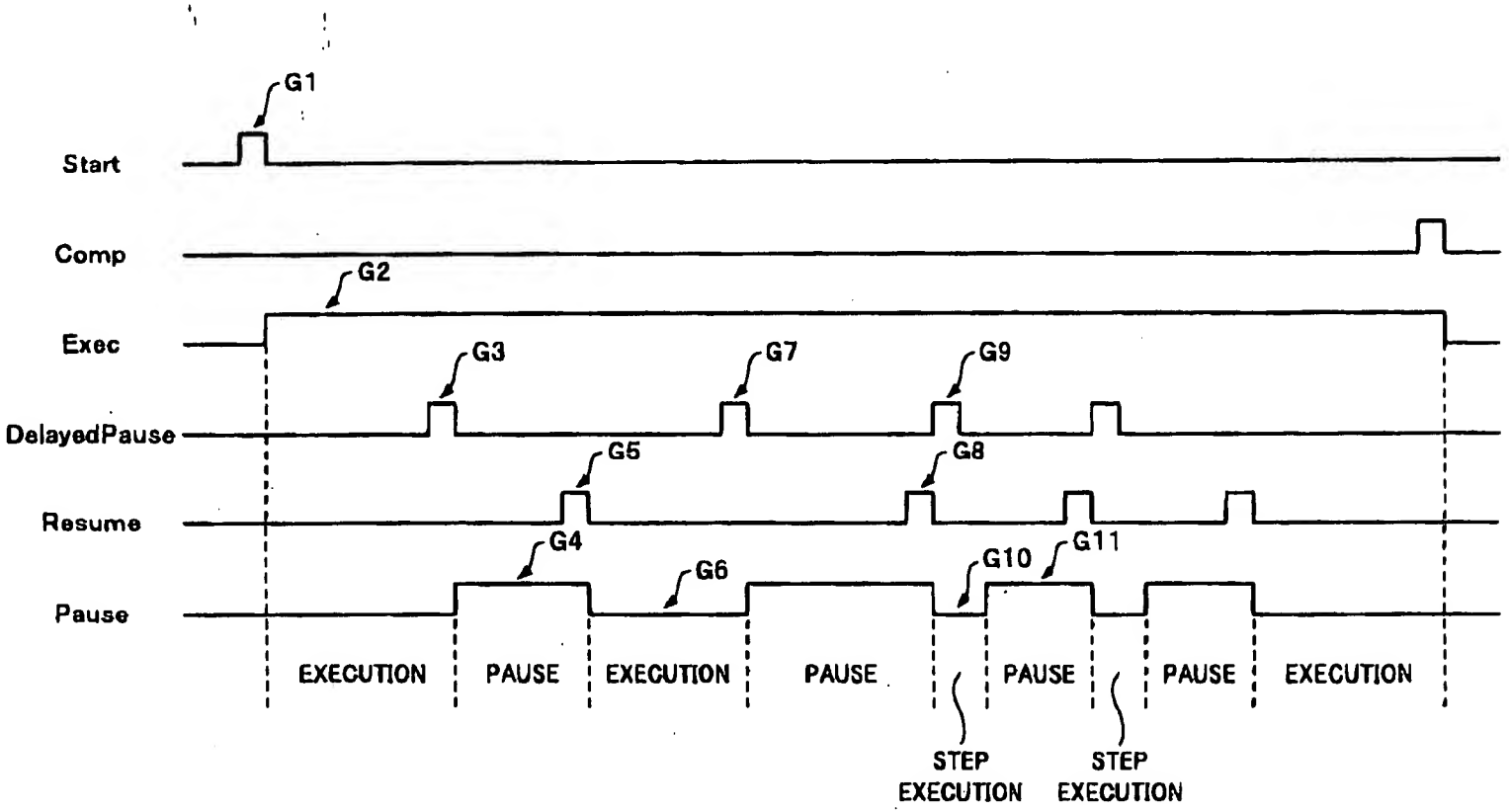


FIG. 23A

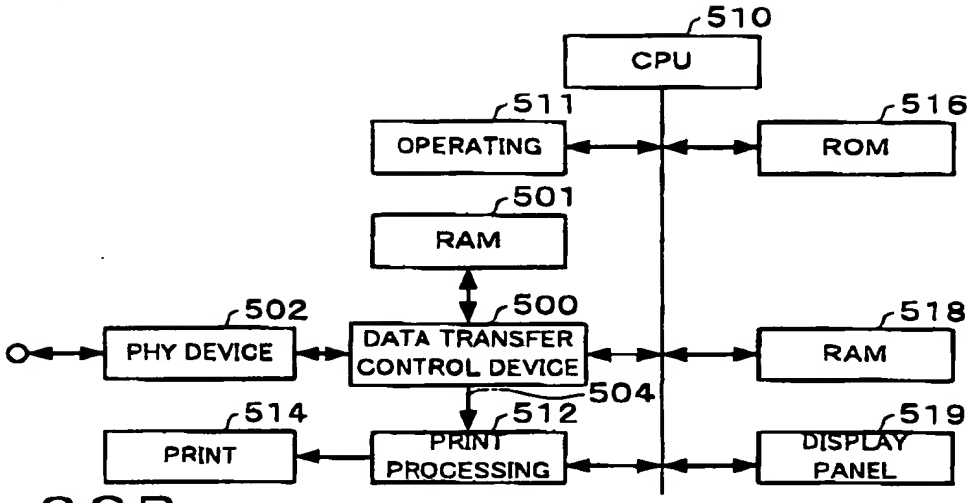


FIG. 23B

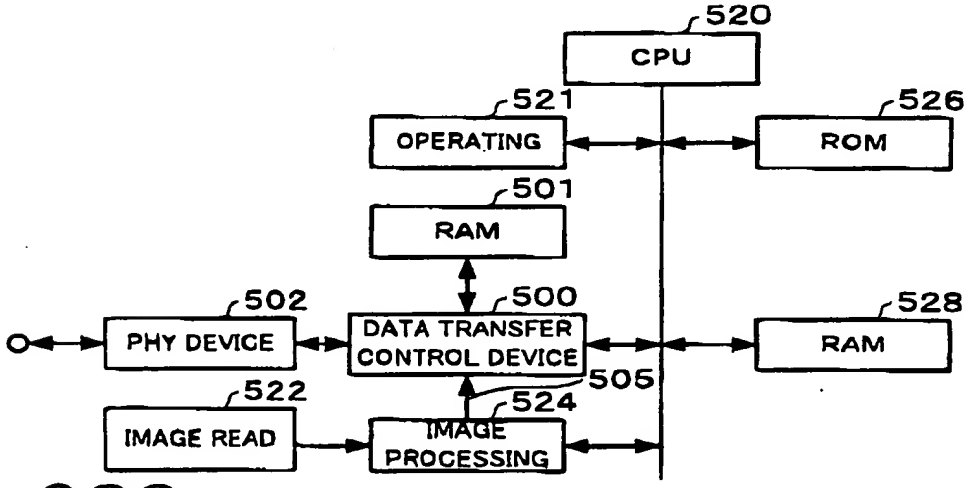


FIG. 23C

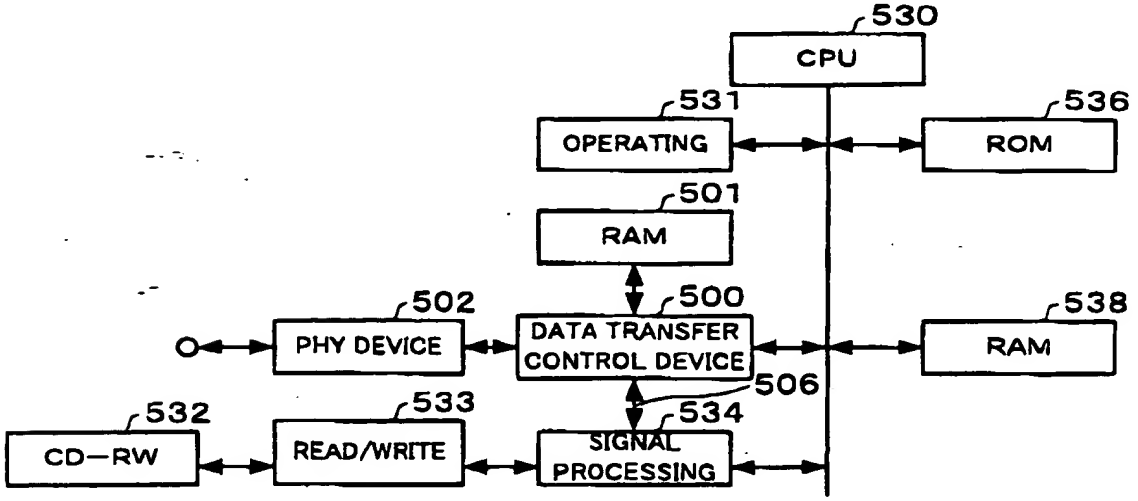


FIG. 24A

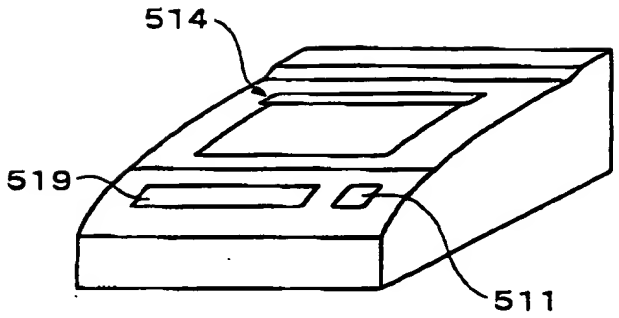


FIG. 24B

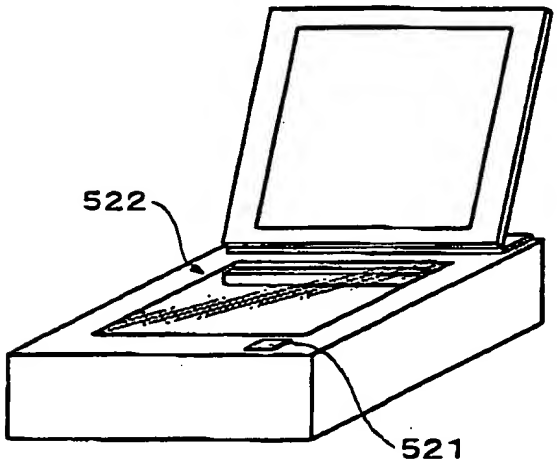
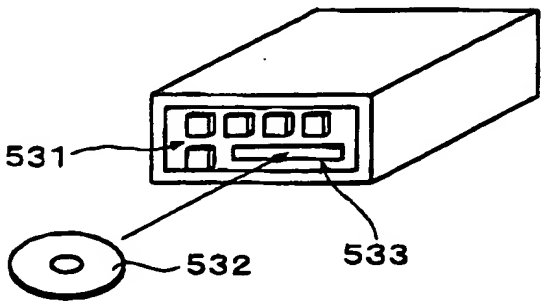


FIG. 24C



0606044-040200